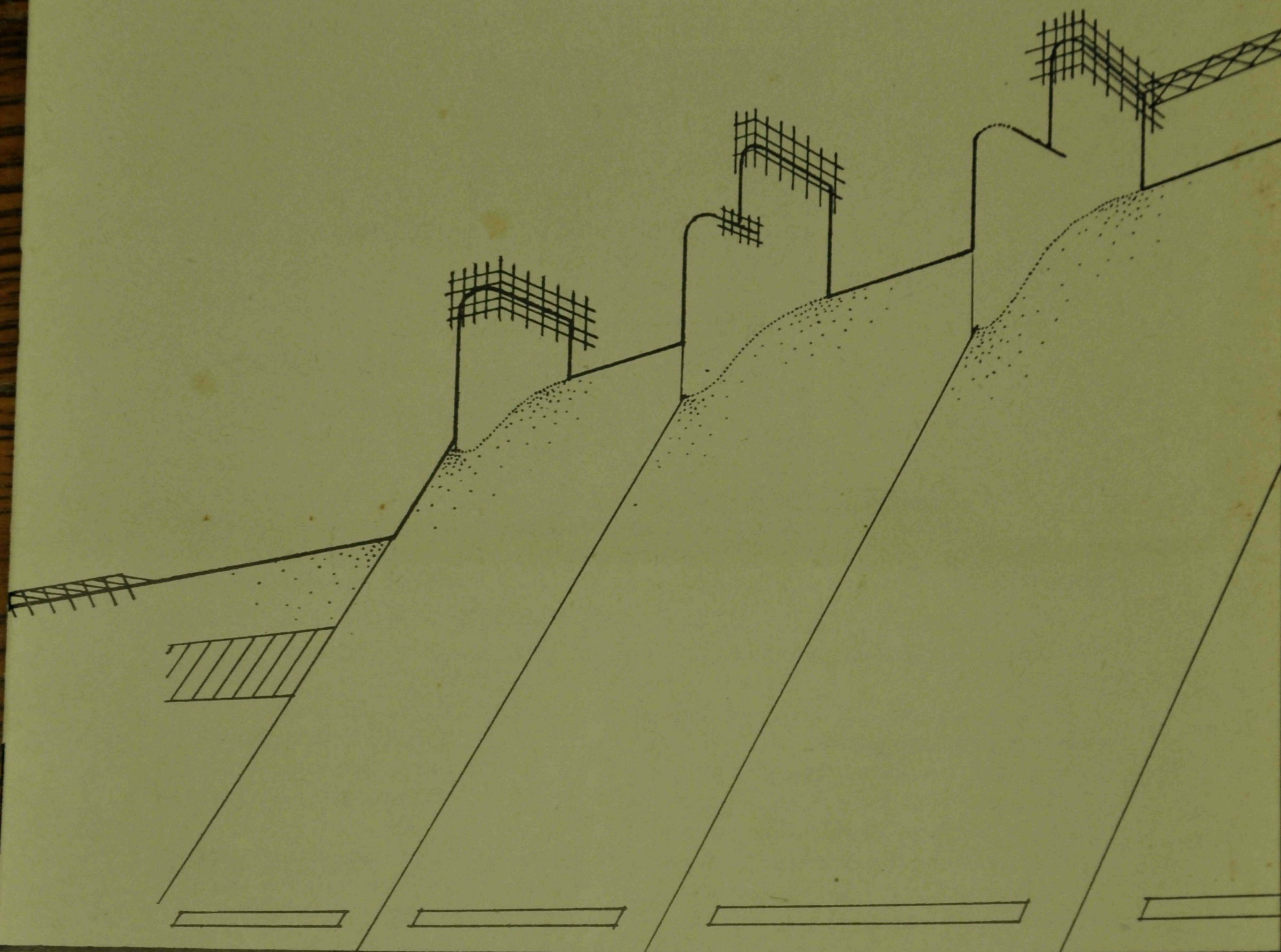


# ENGINEERING



# OPEN HOUSE

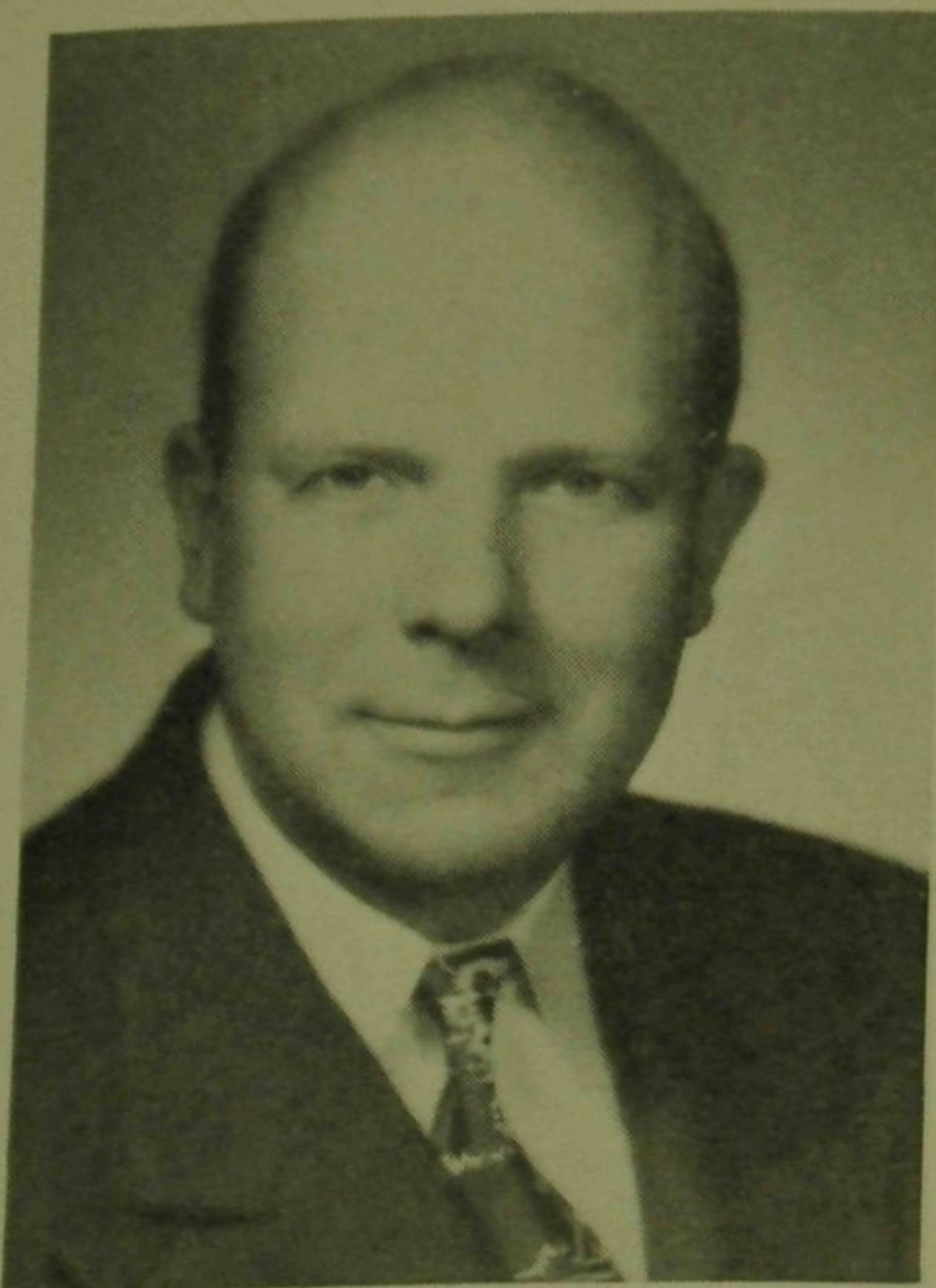
presented by

STUDENTS AND FACULTY  
at the  
UNIVERSITY OF ILLINOIS

march 26 & 27 , 1954



## WELCOME TO OUR SHOW . . .



### Greetings!

This is the fourth time I have written that word of welcome to those attending the Illinois Engineering Open House, and on each occasion I write it with real pleasure.

For we are glad to have you with us. We want you to see our many buildings and extensive equipment. We want you to talk to our faculty and students. We want you to ask questions freely. We want you to have fun at the same time that you increase your knowledge of what engineering is, and of how the University of Illinois College of Engineering operates.

There is one disadvantage of the Open House. It is this: The most important thing about any college of engineering is what cannot be seen — what can't be made visible. I mean the spirit that animates the engineering profession and that inspires the young men and women who are your hosts this week end.

This spirit is compounded of many elements. One is creativeness. Another is sound practical judgment. Others are initiative, ability to cooperate with your fellows, and a desire to serve society. If this spirit is lacking, then no buildings however many and fine, no equipment however extensive and varied and modern, can avail in helping to produce good engineers and citizens.

But at Illinois, we believe, that spirit pervades our engineering work. The result is that our faculty and students make the most of the outstandingly excellent facilities which the people of the State have given us in trust, to use for their benefit and that of the nation as a whole.

We hope, then, that you will not only inspect a host of interesting and informative exhibits, but that you will also think of the spirit behind them — the spirit of sound creative thinking, esprit de corps, cooperation, and service.

We hope, too, that this spirit, as well as the fine physical facilities of the University of Illinois, will lead you to visit us again, not only once but often. You will always be heartily welcome.

W. L. EVERITT

*Dean, College of Engineering*

## . . . HERE IS SOME INFORMATION . . .

Before we start on our tour through the numerous exhibits, here are a few notes intended to help make your visit more pleasant.

### TIME OF OPERATION

The Open House exhibits will be presented from 10 A.M. to 10 P.M. on Friday, March 26, and from 8 A.M. to 4 P.M. on Saturday, March 27.

### INFORMATION

The central headquarters office of the Engineering Open House is located on the basement floor of the Electrical Engineering Building. If you wish any information concerning the Open House, you may stop there or at any of the information desks located at the entrance of every building. At the central headquarters information on entrance requirements, programs for the various departments, and other points of information valuable to prospective students at Illinois is also available. Do not hesitate to ask any of the instructors or staff members present any questions you have about enrolling at Illinois.

### PARKING

Parking stickers for cars and busses are available at the central headquarters in the basement of the Electrical Engineering Building. These stickers will permit parking in any University parking lot. For parking information contact central headquarters upon your arrival.

### REGISTRATION OF VISITORS

Visitor registration sheets, which are a great help in planning our future programs, are placed at the information desks in each building. If you did not register when you received this program, please go to the nearest desk and do so. We also would greatly appreciate your comments and suggestions on any phase of the Open House program. Please place them in the special boxes provided at all the information desks. Thanks!

### LUNCH STANDS

Lunch stands serving soft drinks, hamburgers, hot dogs, ice cream, and potato chips will be located along the Open House route for your convenience. The stands will be located in the M.E. lounge and 6 Aero Lab "B". There will be signs to guide you to the stands.

### PARADE

This year's Engineering Open House parade will be held on Friday, March 26 from 12:30 to 1:00 P.M. The parade is composed of floats entered by the various engineering societies and will follow a route encircling the campus. A special feature of the parade is an Engineering Band consisting entirely of engineering students. Be sure not to miss this part of the program!



## . . . AND THE EXHIBITS . . .

### ROUTING

The route of the visitors covering the engineering campus has been arranged in the form of a circle. Thus you may start at any building, and by following the routing arrows you will successively see every exhibit. The map in the center pages of this program indicates this route by a dash line. Now here is the list of the various exhibits in the order of routing:

### ELECTRICAL ENGINEERING BUILDING

This is the center of our extensive Electrical Engineering department. Here you will see continuous demonstrations of many miracles of electricity and magnetism. There also will be periodical demonstration lectures on topics from this phase of engineering.

Among the interesting displays that you will see are actual flying saucers — no strings, no motors; but they actually fly! You will see a magnetic cannon in operation. It throws projectiles thirty feet or more.

If you have always wanted to be on television, here is your chance to see yourself on TV. You will see and hear an amateur radio station in operation, the radar display, and musical tones converted to soothing hues by the Color Organ. Have you heard of radio-controlled automobiles? You will see in operation a vehicle which is completely controlled by radio waves.

Don't miss the lighting show. See the beautiful effects produced by black light. Learn how lighting affects your everyday life; see a multitude of different lighting fixtures.

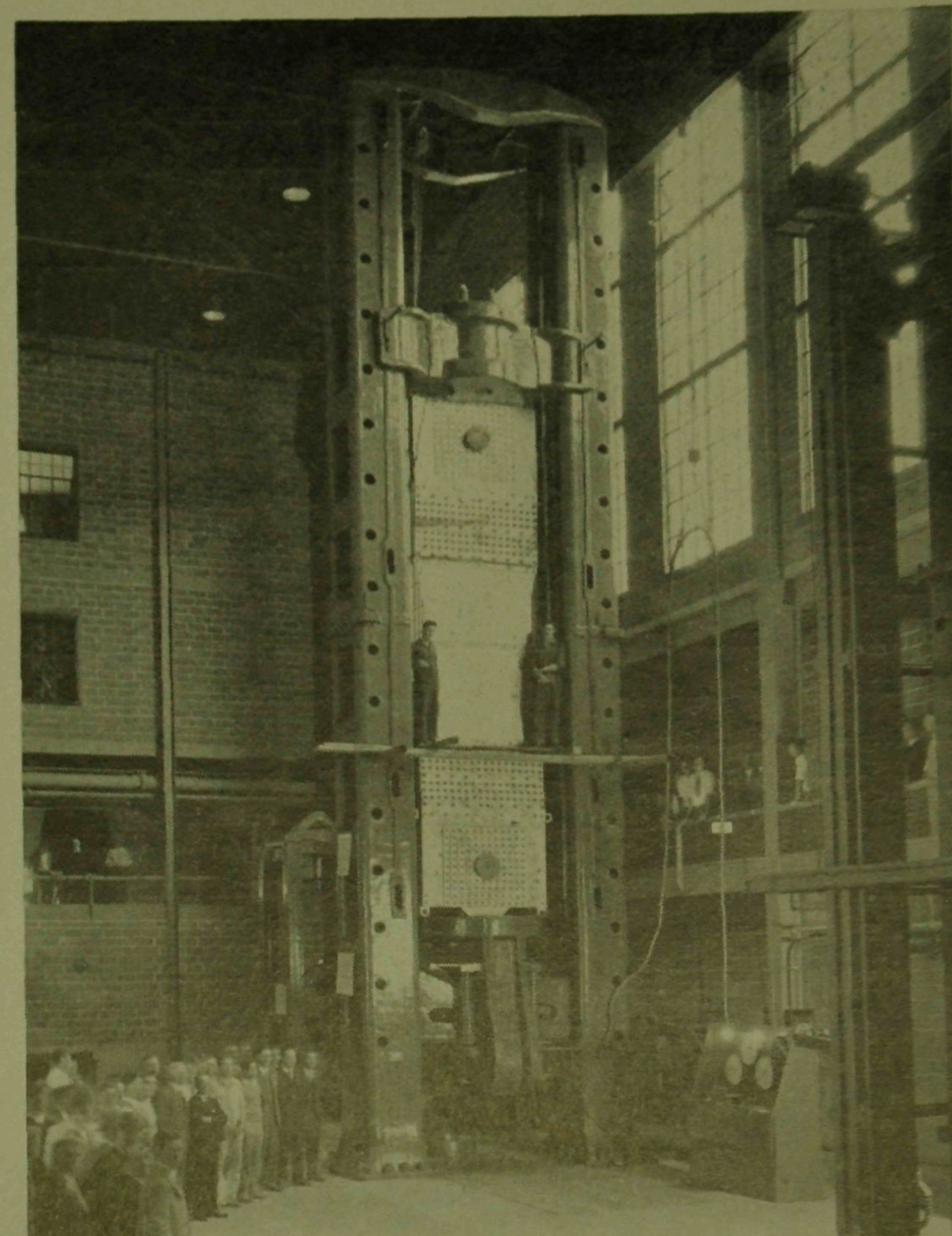
If you want to do things, try to pit yourself against electrical devices. Try the machine to test human power instead of horsepower. Bring your best girl and try the Kissometer! Write your initials with a pencil of electrons on the Ghost Writer. Try your hand at driving a nail; it's easy if you know how!

See these and many other astonishing exhibits in the Electrical Engineering display!

### TALBOT LABORATORY

The Arthur Newell Talbot Laboratory houses the department of Theoretical and Applied Mechanics and some portions of the Civil Engineering department. It is the outstanding building of its kind in the country.

The department of Theoretical and Applied Mechanics will test a large concrete cylinder once an hour on the half hour. The explosive-like failure, shown below, will actually shake the building. The testing machine which



will be used is four stories high and has a capacity of three million pounds. It is the largest testing machine of this type in the middle west.

See water flowing in a glass-walled channel suddenly jump upward to form a nearly vertical wall of water. This extremely interesting phenomenon is known as the "hydraulic jump." Also see, in operation, the pumps, turbines, weirs and a water tunnel which are used in laboratory classes in Fluid Mechanics.

Future engineering students, see the twenty-minute color movie illustrating actual classes in Mechanics that all engineers attend. See a sample of the work included in the teaching and the research programs — every hour on the hour.

Amaze your friends by showing them that you can bend a 2½-inch round brass beam with your little finger. An extremely sensitive electrical device



is used to measure very small amounts of bending and will prove that you can bend the beam with your little finger.

See a rapidly vibrating metal bar "stopped" instantly by a beam of light. Vibration measuring instruments, operating models of various vibration systems and a gyroscope will be on display.

Produce color by change of force — operate the colorful photoelastic display.

See solid lead squeezed through a small hole to form a slender lead ribbon in a typical class demonstration of the extrusion process of forming structural metal members. Other class activities that will be in operation include pulling steel bars in two and crushing wood blocks.

Metals get tired too — climb to the top floor and see (a) metals fractured by many millions of repetitions of load in the Fatigue of Metals Laboratory and (b) metals fractured after many years of steady load at elevated temperature in the Creep of Metals Laboratory.

Research in Structural Engineering, a part of the Civil Engineering department's program, is concentrated in the two large crane bays of Talbot Laboratory, where you will see parts of large steel and concrete structures being tested. In the four large 200,000-lb. fatigue machines, bridge members can be loaded in days with loads which represent fifty years of service in a bridge. These tests as well as the many others in progress are designed to provide everyone with safer and more economical bridges and buildings.



## FOUNDRY

The foundry is a part of the Mechanical Engineering department. On the main floor see demonstrations of the casting of iron and the making of sand molds. Aluminum and bronze souvenirs will be available to the visitors.

In the basement core making and drying and sandblasting are performed, while various properties of molding sands are tested in the Sand Testing Laboratory. Gray iron will be poured on Friday evening beginning at 7:30 P.M.

## AERONAUTICAL ENGINEERING LABORATORIES

Have you ever wanted to be behind the controls of an airplane? Wonder what the inside of a rocket motor looks like? Curious about shock waves? Then don't fail to stop in at Aeronautical Engineering Labs A and B, where you'll see these and many other interesting exhibits.

At Aero Lab A, see the wind tunnel in operation, a device which makes possible the measurement of lift and drag forces on an airfoil at various speeds. In Laboratory B, a smoke tunnel presents a visual picture of the flow of air about a body by means of smoke streams. At a nearby display, you can actually see shock waves generated by a supersonic-type airfoil. The huge shock tube, centrally located in Lab B, permits the study of air flow and pressures about a body at supersonic speeds; the Schlieren photographic process is used to record the pressure distribution in the shock tube.

Visit the Structures Testing Lab: See polarized light used to study the stress distribution in an airfoil; watch a hydraulic drop test of full-sized landing gear; and see the dynamic testing of other actual aircraft structures.

Be prepared for an ear-splitting roar as a tiny ram-jet, no bigger than your fist, bursts into life. See a cutaway model of the famous Walther rocket engine, which powered the deadly Luftwaffe interceptor aircraft of World War II. A multitude of power plants will be on display — the world's largest pulse jet, a valveless pulse jet developed at this University, the first turboprop engine, a J-35 turbojet engine (used in the famed Thunderjet F-84G fighter-interceptor), an R-2850 reciprocating engine, and many others.

A two-place glider, built and tested by members of the U. of I. Glider Club, will be displayed in Laboratory B. At the rear of this building, color films showing the latest developments in aeronautical research will be run at frequent intervals during the exhibit.

## ENGINEERING RESEARCH BUILDING

Here for the first time in the history of our Engineering Open House you will be able to see the million-dollar *Illiac*, the electronic digital computer of the University of Illinois.



One of the few digital computers of its size in the United States and the world, the Illiac is one of the outstanding examples of the achievements of our College of Engineering. The Physics department will provide information on the construction and operation of the Illiac. You really can't afford to miss this display, now opened for the first time to the visitors of the Open House.

### MECHANICAL ENGINEERING LABORATORY

In this laboratory you will see many of the most important types of power machines in operation, such as the Murray Corliss Steam Engine, a large Otto Gas engine, an Allis-Chalmers Corliss Steam Engine, a large Deisel engine, a Terry seven-stage steam turbine, and many others.

See the driver reaction-time testing machine. Test your own reaction time. Have you wondered just what makes a jet airplane go? See the cut-away J-33 aircraft jet engine. Don't miss the Physical Environment Laboratory — see the high-altitude test chamber.

### TRANSPORTATION BUILDING

The Transportation Building contains the classrooms, drafting rooms, and offices of the department of General Engineering. Since drawings are essential for any engineering project as a universal language for the conveying and exchange of plans and ideas, every engineering student is required to obtain some proficiency in this field.

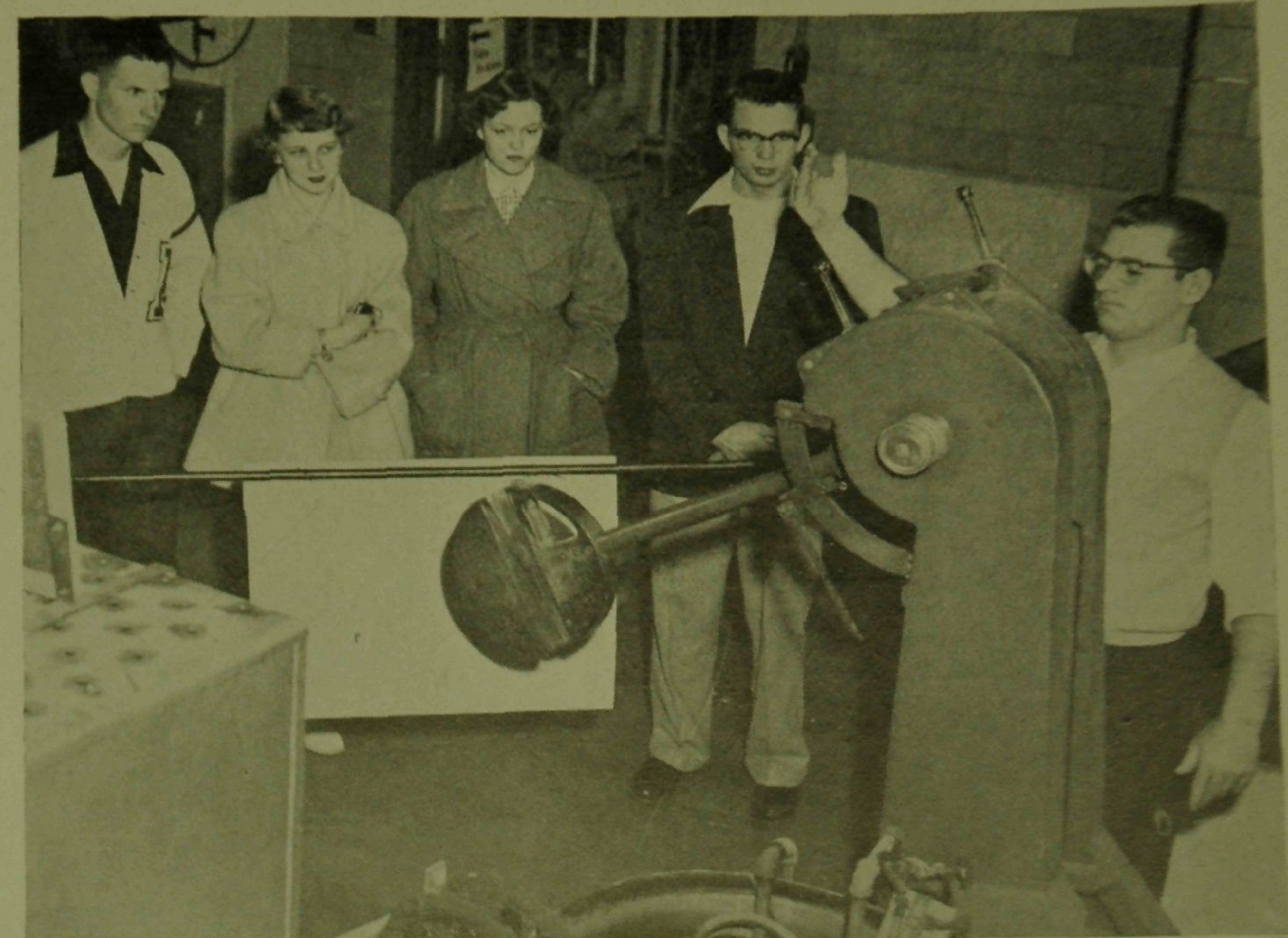
You will see exhibits of student drawings in the following courses: production illustration, descriptive geometry, machine drawing, architectural drawing, geological drawing, aircraft drafting and lofting, graphical computations, and perspective drawing.

There will be demonstrations of the use of the following drafting equipment: airbrush and doubletone, fifty different slide rules, lettering, machines, pantograph, ellipse machine, machines for reproducing drawings, black light, and scribing on plastic sheets.

### MINING LABORATORY

In the Mining Laboratory of the department of Mining and Metallurgy, coal and its products will be on display with some mining equipment — mine ventilation apparatus, mine safety lamps, diamond drilling, particle sizing using infra-sizer, models of mining methods, important minerals of mining, and gas analysis equipment, its operation and use.

There will be demonstrations of the Separation of Minerals — Separation of galena, sphalerite, and limestone by oil froth flotation. Coal Preparation — Coal washing, and flotation of coal fines. Explosibility of coal dust — Causing coal dust, ordinary house flour, and sulphur to explode.



Photoelasticity — Its application in determination of stresses around mine openings. Movies of mining and metallurgical operations will be shown in Room 203 of Metallurgy Laboratory.

### METALLURGY LABORATORY

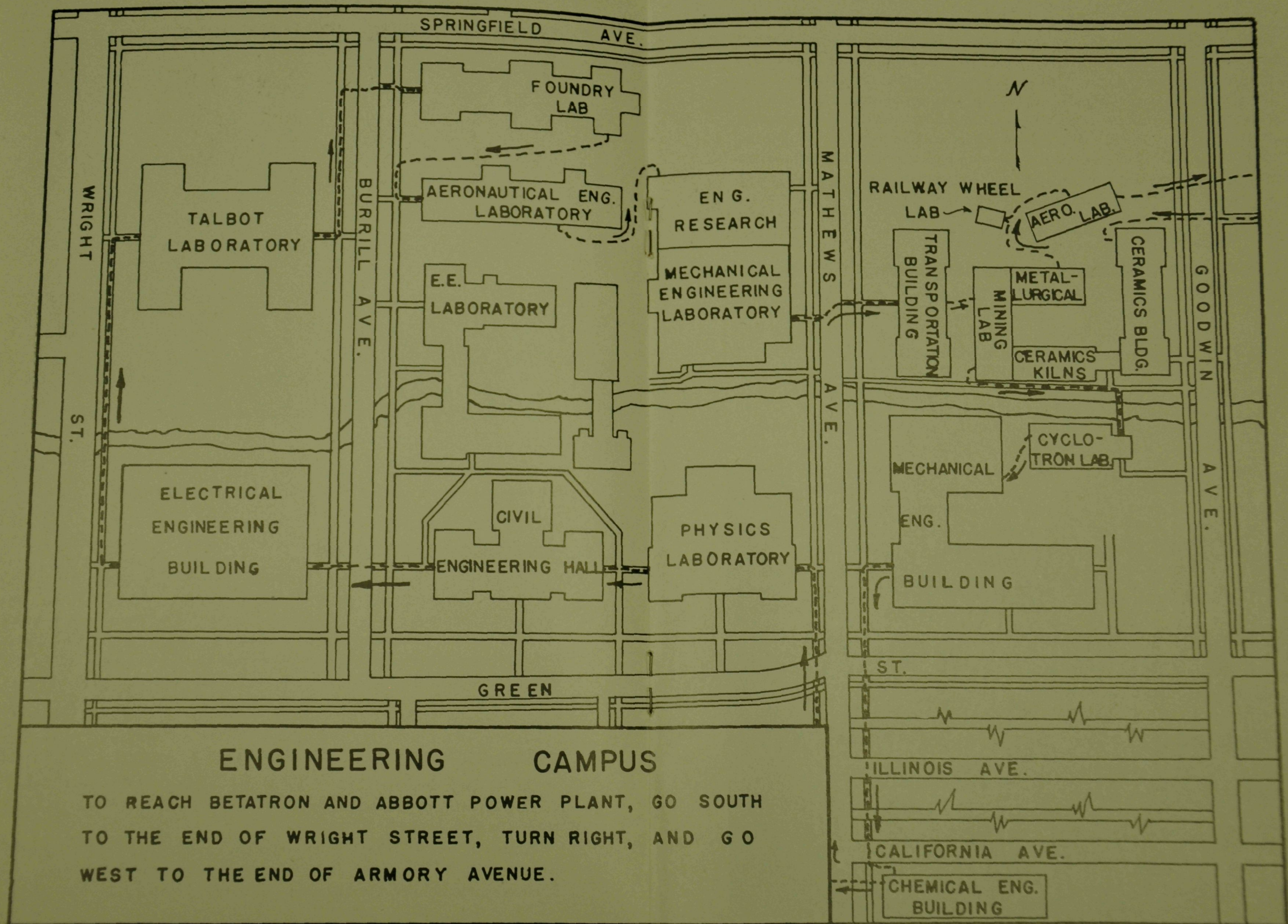
The following displays will be presented: Structure of metals through a microscope, steel magnified one thousand times, brass cast at 2600 deg. F., steel shrinkage upon heating, magnetic inspection showing invisible cracks in metal parts, steel hardened by heat treatment. See metal run like water, feel cold metal mysteriously get hot while you hold it in your hand. Get a nickel-plated good luck piece, nickel-plated while you watch. Hear metal cry out loud! There will also be movies of metal production, forming, and heat treatment.

### CERAMICS BUILDING

As its name indicates, this is the headquarters of the Ceramics Engineering department — little publicized, but, as you will see, a very important branch of engineering.

You will see the Ceramic Engineering exhibit of everyday ceramics presented in the following divisions: *abrasives* — depicting the processes involved in combining the abrasives and binders to form abrasive wheels,







disks, and belts, *enamels* — illustrating the versatility of porcelain enamels and their value to the individual, including demonstrations of the application of the enamel to steel, *glass* — showing the results of the endeavors of the glass technologist to develop glass into the versatile material which is basic to our civilization, *refractories* — illustration linings in blast furnaces, glass tanks, etc., together with sample refractory materials and examples of their use, *structural clay products* — showing typical structural clay products which have added to the advance of our present-day civilization, and *whitewares* — showing the steps in making dinnerware and demonstrating the important properties of ceramic whiteware, including electrical porcelains.

### NORTH CAR GARAGE (Agricultural Engineering)

Since the Agricultural Engineering buildings are rather far from the main engineering campus, a special exhibit showing the application of engineering principles to agricultural problems will be presented by the Agricultural Engineering department in the North Car Garage.

In this exhibit you will see displays of Farm Mechanization, Rural Electrification, Agricultural Architecture and Irrigation, Drainage and Soil Conservation.



### CYCLOTRON BUILDING

The Cyclotron Building is a part of the Physics department. Here you will be able to see the famous University of Illinois cyclotron, a device used for the acceleration of particles in atomic and nuclear physics research. Guided tours will be conducted continuously through the building and you will actually see all the awesome equipment of modern research in physics.

### MECHANICAL ENGINEERING BUILDING

In this main building of the department of Mechanical Engineering you will see the following exhibits of the many and varied phases of mechanical engineering:

In the Machine tool lab see machine tools, demonstrations of operations of special machines, and a punch press which will be stamping out souvenirs. In the heat treating lab you will see steel heated by induction and then treated. If you're interested in welding, you will see gas welding, torch cutting, arc welding, spot welding, and metal spraying in the welding lab.

In the internal combustion engine lab there will be on display standard automotive and Diesel engines on dynamometer test stands. You will see just how the horsepower rating is measured.

Scientific management will be on display in the motion and time study laboratory. Here you will see displays of the application of work simplification of many types of jobs. The necessary equipment to make methods-time analyses of work tasks is also shown with indications of its proper uses.

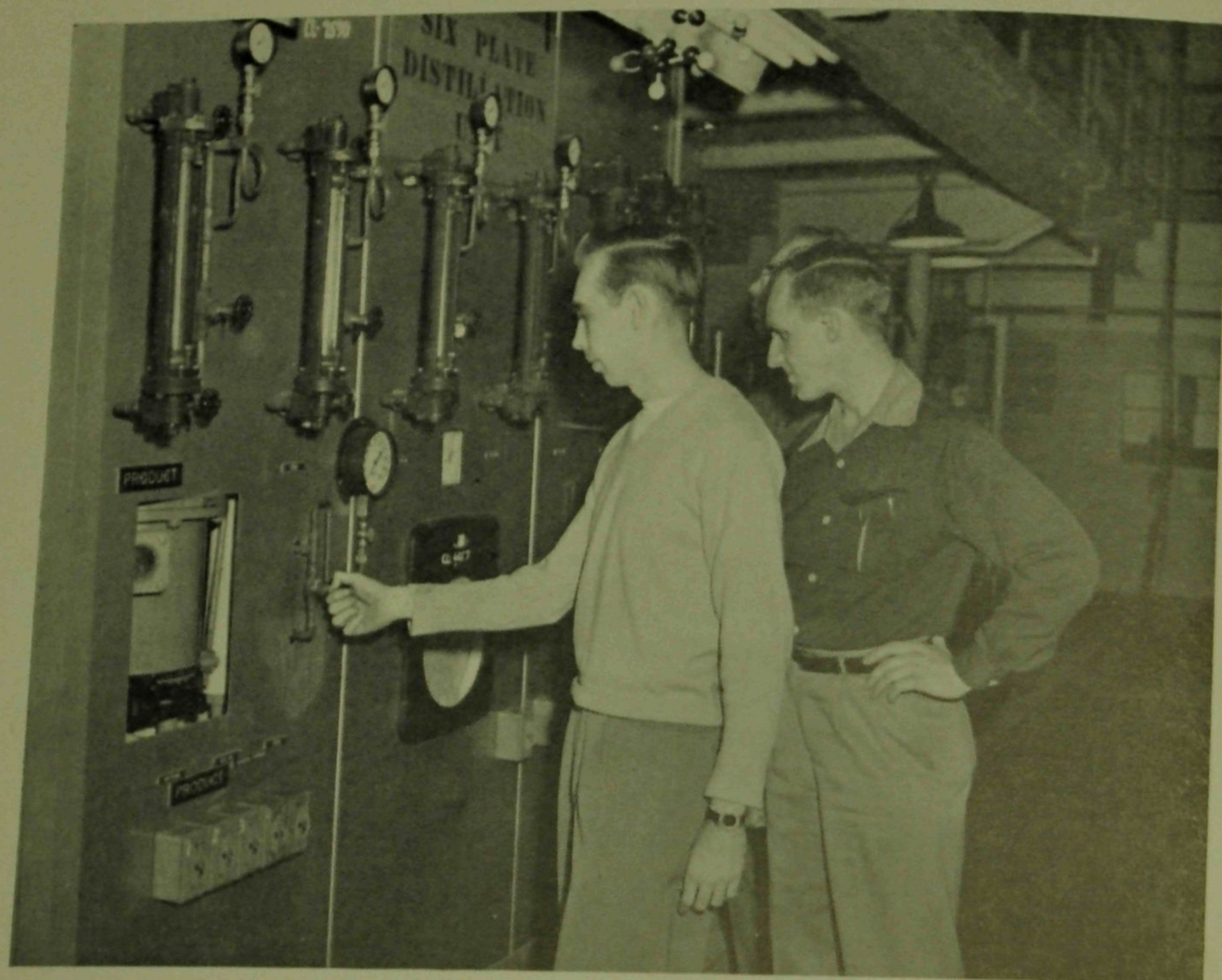
See the photoelastic stresses in gear teeth, the fatigue of metals as seen under a microscope, a balancing machine, gyroscope, and lubrication models in the machine design lab. You can also see a water table for fluid flow study in the thermodynamic research laboratory.

### CHEMICAL ENGINEERING BUILDING

The home of the Chemical Engineering department also contains quite a few surprises for our visitors. Though it may sound unbelievable, an unheard-of public exhibition of the *conversion of energy into matter* will be in operation. Within a few seconds the size and weight of a piece of coal will increase over tenfold. This exhibit is only one of the many awesome displays which will compose a half-hour "Chemical Magic" extravaganza. (Show time — every hour on the hour.)

Individual displays of fundamental chemical engineering processes will also be in continuous operation. The treatment of ores prior to their use in chemical processes will be illustrated by the operation of a cone crusher, a jaw crusher, and screening equipment. An absorption column will be operated to illustrate the continuous separation of a mixture of two gases, one of which is water soluble. The continuous removal of solid particles from





a liquid will be accomplished with a rotary filter. The separation of two liquids whose near-boiling points make distillation impractical will be demonstrated with a ten-foot liquid-liquid extraction tower. An all glass, bubble cap, distillation column will be operated to illustrate the continuous separation of multicomponent mixtures.

A research project consisting of the study of the three types of boiling in a fluid will be on display. A fluidized bed, another research project, will be operated to demonstrate the suspension of a solid catalyst in a fluid as a means of achieving better fluid-catalyst contact.

The bioengineering division of the Chemical Engineering department will present an exhibit of fermentation processes.

Chemical engineering students will be available to discuss with all who are interested the possibility of choosing chemical engineering as a profession.

### PHYSICS LABORATORY

In this stronghold of the Physics department the Physics Society of the University of Illinois welcomes you to the exhibits and demonstrations, designed and built by its members, of the various phases of applied physical sciences. These exhibits will acquaint you with the main fields of Sound, Light, Heat, Mechanics, and Electronics as well as Atomic and Nuclear

Physics. There also will be a high voltage display and a spectacular demonstration of low-temperature physics, as well as many other displays and demonstrations.

Besides the exhibits in the Physics Laboratory, the department of Engineering Physics also sponsors the exhibits in the Cyclotron and Betatron Laboratories and the exhibit of the *Illiac* in the Engineering Research Building, listed under those titles in this program.

### CIVIL ENGINEERING HALL

In this venerable building of the Civil Engineering department, also housing the offices of the Dean of the College of Engineering and the Engineering Library, you will see the varied exhibits of the civil engineers.

The civil engineer is responsible for the design, construction, and surveying of buildings, highways, railroads, bridges, dams, airfields, canals, water and sewage systems, harbors, and tunnels. Since civil engineering covers such a broad field, the curriculum of the department is divided into options. These options include structural design, highways, railroads, construction, and sanitary engineering. Each of these options will present exhibits showing the procedures and equipment used in solving its problems. Surveying equipment and mapping procedures used in all phases of civil engineering will also be exhibited.

### R. O. T. C. EXHIBITS

In addition to all other exhibits, the Army, Navy, and Air Force Reserve Officers' Training Corps Units will have exhibits and training aids at various points along the Open House route.

### ABBOTT POWER PLANT AND BETATRON BUILDING

The power plant of the University will be open for general inspection. Here you will see power-generating machinery under actual working conditions.

Across the street from the power plant you will be able to visit the famous Betatron in the Physics Research Building. There will be guided tours with explanations of this famed research device. Be sure not to miss this extremely interesting tour through this scientific wonderland.

The power plant and the Betatron are located at Oak and Gregory Streets in Champaign on the southwest part of the campus and can be reached by going west on Gregory or Armory Streets to their termination. Armory Street begins at the south end of Wright Street.





## ... A GOLDEN ANNIVERSARY ...

### HISTORY OF THE UNIVERSITY OF ILLINOIS ENGINEERING EXPERIMENT STATION

Shortly before the turn of the century, several members of the College of Engineering here at the University of Illinois realized the growing need for a systematic research program to complement the engineering educational system. It had become time to coordinate the limited research endeavors of the individual departments into a centralized organization designed "to conduct investigations and make studies of importance to the [professional] engineering and industrial interests of the State."

At this time, Professor L. P. Breckenridge, Head of the Mechanical Engineering department, to whom much of the credit for the creation of the Station is due, had been attempting to secure Federal aid in establishing engineering experiment stations similar to the agricultural experiment stations. Failing in this purpose, he proposed that such an institution be established at the University with state funds. As a result, a special request for funds to expand the activities of the Engineering College was made by the Board of Trustees in its legislative appropriations list of December, 1902. In May, 1903, \$150,000 was granted by the General Assembly, and on December 8, 1903, the Board of Trustees established the Experiment Station.

Though the first bulletin appeared in September, 1904, the station

wasn't formally organized until June, 1905. At that time, administrative duties were delegated to the Director, who since 1909 has been the Dean of the College of Engineering, and an Executive Staff now composed of the Associate Director, the departmental heads in the College, the professor in charge of Chemical Engineering, and the Director of Engineering Information and Publications. This staff is responsible for the general policies correlating and directing the station's research program.

Some three years ago, the increase of the number of projects and expanded scope of administrative duties led to the establishment of the post of Associate Director. At present, Dean W. L. Everitt is Director, while Professor R. J. Martin serves as Associate Director, and Professor L. A. Rose is Director of Engineering Information and Publications. In addition to these posts, Professor E. J. Heater served as technical illustrator-draftsman from 1918 until June, 1953. In this capacity, he aided the authors of reports in correlating their data, checking accuracy, and perfecting and arranging their drawings. His successor is Donald Engstrom.

The philosophy governing the policy of the station has been to encourage all members of the faculty to pursue projects of study which are important to engineering technology and science and which interest them. Provision has been made for graduate and even undergraduate students to take part in these programs—thus closely integrating the teaching and research activities of the College.

Among the older projects of note are railroad rail studies, boiler water treatment in connection with power boiler equipment, heating research, and "high-speed" tool steel studies. The first bulletin published by the station was concerned with Professor A. N. Talbot's studies of reinforced concrete. It is interesting to note that the first reinforced concrete bridge in the United States spanned the Boneyard and contained railroad rails as the reinforcing material.

At the present time over 200 problems are being studied and the rate of expenditure for research is over three and one-half million dollars. A number of the newest projects, some of which are grouped together in the Control Systems Laboratory, concern many subjects vital to our present defense program. Then too there are studies of transistors in the Electrical Engineering department, renewed work on tool steels to resist high temperatures by the Mechanical Engineering department, nuclear and solid state studies by the Physics department, Structural Engineering research by the Civil Engineering department, and tests with radioactive sewage on present-day treatment techniques by the Sanitary Engineering department.

As the first research organization of its kind to be established within an Engineering College in this country, the Engineering Experiment Station has not only made numerous contributions to the profession and to industry, but has also served as a pattern for the many others which have since been founded elsewhere.



## ... AND FINALLY, OUR THANKS!

A project like the Engineering Open House requires an immense amount of time and effort from a great many students, faculty, and staff members of the College of Engineering, as well as many of their friends. Here we wish to thank once more everyone who has contributed his efforts toward the success of the 1954 Engineering Open House at the University of Illinois.

Our special thanks should go to Keith Yarborough for his fine article on the 50th anniversary of the Engineering Experiment Station and to Algimantas Zemaitis, who designed the cover.

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### OPEN HOUSE PERSONNEL

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